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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,683	11/28/2001	Hideki Iwaki	P64916US1	8158

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EXAMINER	
ANDUJAR, LEONARDO	
ART UNIT	**PAPER NUMBER**
2826	

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/994,683	Applicant(s) IWAKI ET AL.
	Examiner Leonardo Andújar	Art Unit 2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, causa the application to becoma ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/24/2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 15* is/are pending in the application.

4a) Of the above claim(s) *15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/417,662* .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Acknowledgment

1. The amendment filed on 11/28/01, paper no. 3, in response to the Office action has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-11 and 15.

Election/Restrictions

2. Applicant's election without traverse of claims 1-11 in Paper No. 5 is acknowledged.

Priority

3. This application filed under former 37 CFR 1.60 lacks the necessary reference to the prior application. A statement reading, "This is a divisional of Application No. 09/417662, filed 10/14/1999." should be entered following the title of the invention or as the first sentence of the specification. Also, the current status of all nonprovisional parent applications referenced should be included. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/417662, filed on 10/14/1999.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: The ground 140 does not appear in any figure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid

abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young (US 5,408,053).

8. Regarding claim 1, Young (attached fig 1) shows a multilevel circuit substrates comprising:

- At two interconnections layers (11a, 11c) oppositely placed to each other;
- An insulator 13 provide between the interconnect layers;

- Connection members 15 provided penetrating through said insulator along an opposed direction of the interconnect layers and connecting between the interconnect layers;
- An intermediate connection layer 11b sandwiched by the connection members at a center position of the connection members provide along the oppose direction of the interconnect layers and electrically connecting between one end and the other end of the connection member;
- A shield layer (21b, 31b) provided nearly on a same plane as the intermediate connection layer and placed spaced from around the intermediate connection layer.

9. Young suggests that the interconnection layer may have different shapes (col. 3/lls. 1-11). Also, the distance between the shield layer and the connection layer G1 may have a uniform or non-uniform width (col. 3/ll. 32-47). Nonetheless, Young does not disclose that the connection layers and members have a generally circular shape. Therefore, Young does not disclose that a condition of $(R \bullet r)/(2 \bullet h) \leq L \geq (5 \bullet R \bullet r)/h$ is satisfied where h is distance between the interconnect layers through the connection members and the intermediate connection layer, R is the diameter of the connection members, r is the diameter of the intermediate connection layer, and L is the space distance between the intermediate connection layer and the shield layer. Although Young does not specify that the multilevel circuit substrate dimensions satisfy the condition of $(R \bullet r)/(2 \bullet h) \leq L \geq (5 \bullet R \bullet r)/h$ as claimed by the applicants, differences in shape and dimensions are considered obvious design choices and are not patentable

unless unobvious or unexpected results are obtained from these changes. Note that Young teaches that the connection layer widths and the distance between the intermediated connection layers are design parameters, which affect the device final characteristics such as frequency, impedance and conductor loss (col. 1/lls. 39-60). Accordingly, it would be an obvious matter of design choice to select a suitable device dimensions since they are design variables subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235. In re Leshin, 125 USPQ 416.

10. Regarding claim 2, Young discloses that the insulator 13 has lower and upper insulation layers (13a, 13b) placed stacked with each other. The intermediate connection layer and the shield layer are sandwiched between the lower insulation layer and the upper insulation layer. The connection member 15 comprises a lower connection member 15b provided penetrating though the lower insulating layer in a thickness direction thereof and electrically connecting between the interconnect layer position lower and the intermediate connection layer and an upper connection member 15a provided penetrating though the upper insulating layer 13a in a thickness direction thereof and electrically connecting between the interconnect layer position upper and the intermediate connection layer.

11. Regarding claim 3, Young discloses that the shield layer is a ground conductor (col. 3/lls. 12-67).

12. Regarding claim 4, Young discloses most aspects of the instant invention except that the shield layer is a power source layer. Nonetheless, this type of claim language is considered as an intended use of the conductive layers (21b, 31b). Intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963).

13. Regarding claim 5, Young shows most aspects of the instant invention including a transmission line structure. Although Young does not specify that the distance h is greater than 1/1500 the wavelength of transmission signal as claimed by the applicants, differences dimensions are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. Accordingly, it would be an obvious matter of design choice to select a suitable device dimensions since they are design variables subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235. In re Leshin, 125 USPQ 416.

14. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young (US 5,408,053) in view of Hayashi (US 5,406,235).

15. Regarding claim 6, Young (e.g. fig. 1) shows a multilevel circuit substrates comprising:

- At two interconnections layers (11a, 11c) oppositely placed to each other;
- A first insulator 13a provide between the interconnect layers;
- Connection members 15 provided penetrating through said first insulator along an opposed direction of the interconnect layers and connecting between the interconnect layers;
- An intermediate connection layer 11 b sandwiched by the connection members at a center position of the connection members provide along the oppose direction of the interconnect layers and electrically connecting between one end and the other end of the connection members;
- A shield layer (21b, 31b) provided nearly on a same plane as the intermediate connection layer and placed spaced from around the intermediate connection layer.

16. Also, a gap formed between the intermediate connection layer and a second 13b insulator fills the shield layer. However, Young does not disclose that the second insulator has a specific dielectric constant lower than the dielectric constant of the first insulation layer. Hayashi discloses that the size of the high frequency device can be reduced without decreasing the Q factor by sandwiched high dielectric constant layer with low dielectric constant layers (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second insulator

layer of Young having a specific dielectric constant lower than the first insulation in order to reduce the device size without decreasing the Q factor as taught by Hayashi.

17. Regarding claim 7, Young suggests that the interconnection layer may have different shapes (col. 3/lls. 1-11). Also, the distance between the shield layer and the connection layer G1 may have a uniform or non-uniform width (col. 3/ll. 32-47). Nonetheless, Young does not disclose that the connection layers and members have a generally circular shape. Therefore, Young in view of Hayashi does not explicitly disclose that a condition of $\left(R \bullet r \bullet \sqrt{\varepsilon'}\right)/\left(2 \bullet h \bullet \sqrt{\varepsilon}\right) \leq L \geq \left(5 \bullet R \bullet r \bullet \sqrt{\varepsilon'}\right)/\left(h \bullet \sqrt{\varepsilon}\right)$ is satisfied where ε is the specific dielectric constant of the first insulator, ε' is the specific dielectric constant of the second insulator, h is distance between the interconnect layers through the connection members and the intermediate connection layer, R is the diameter of the connection members, r is the diameter of the intermediate connection layer, and L is the space distance between the intermediate connection layer and the shield layer. Although Young in view of Hayashi does not specify that the multilevel circuit substrate dimensions and the value the dielectric constant satisfy the condition of $\left(R \bullet r \bullet \sqrt{\varepsilon'}\right)/\left(2 \bullet h \bullet \sqrt{\varepsilon}\right) \leq L \geq \left(5 \bullet R \bullet r \bullet \sqrt{\varepsilon'}\right)/\left(h \bullet \sqrt{\varepsilon}\right)$ as claimed by the applicants, differences in shape and dimensions are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. Note that Young teaches that the connection layer widths and the distance between the intermediated connection layers are design parameters that affect the device final characteristics (i.e. frequency, impedance and conductor loss, col. 1/lls. 39-60) whereas Hayashi teaches that the selection of the dielectric materials will affect the

device final characteristic (i.e. Q factor). Accordingly, it would be an obvious matter of design choice to select a suitable device dimensions since they are design variables subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235. In re Leshin, 125 USPQ 416.

18. Regarding claim 8, Young discloses that the insulator 13 has lower and upper insulation layers 13 placed stacked with each other. The intermediate connection layer 11b and the shield layer (21b, 31b) are sandwiched between the lower insulation layer 13b and the upper insulation layer 13a. The connection member 15 comprises a lower connection member 15b provided penetrating though the lower insulating layer in a thickness direction thereof and electrically connecting between the interconnect layer position lower and the intermediate connection layer and an upper connection member 15a provided penetrating though the upper insulating layer 13a in a thickness direction thereof and electrically connecting between the interconnect layer position upper and the intermediate connection layer.

19. Regarding claim 9, Young discloses that the shield layer is a ground conductor (col. 3/lls. 12-67).

20. Regarding claim 10, Young discloses most aspects of the instant invention except that the shield layer is a power source layer. Nonetheless, this type of claim language is considered as an intended use of the conductive layers (21b, 31b). Intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably

distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963).

21. Regarding claim 11, Young shows most aspects of the instant invention including a transmission line structure. Although Young does not specify that the distance h is greater than 1/1500 the wavelength of transmission signal as claimed by the applicants, differences dimensions are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. Accordingly, it would be an obvious matter of design choice to select a suitable device dimensions since they are design variables subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235. In re Leshin, 125 USPQ 416.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sturzebecher et al. (US 5,830,301) and Josefsson et al. (US 4,494,083) disclose structures and procedures similar to the instant invention.

23. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 4C23. The faxing of such papers must

conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2826 Fax Center number is **(703) 308-7722** or **–7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2814 applications.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the hours of 9:00 AM to 7:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Leonardo.Andujar@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601.

25. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900.**

26. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass (es): 257/758, 759, 798; 174/262,263, 264	07/03
Other Documentation:	
Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB)	07/03

Leonardo Andújar
Patent Examiner Art Unit 2826
7/8/03

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